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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,103	11/21/2001	Yeong Suk Choi	ASIAP112	2816

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EXAMINER

ZALUKAEVA, TATYANA

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 10/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/990,103

Applicant(s)

CHOI ET AL.

Examiner

Tatyana Zalukaeva

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 6,12 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-13 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of species exemplified in Example 2 (pages 14-15) in Paper No. 12 is acknowledged.
2. Claims 6, 12 and 13 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 12.
3. Claims 1-5, 7-11 are examined on the merits.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5, 9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 97/00910. The disclosure of WO'910 reads on the instant claims as follows:

Wo'910 discloses formation of polymer nanocomposite by emulsion polymerization, more specifically formation of layered silicate intercalated with an emulsion polymer.

(abstract). Layered clay minerals of WO'910 is preferably montmorillonite is composed of silicate layers with the thickness of about 1 nanometer (10 angstrom) (page 1, lines

Art Unit: 1713

8-10, page 3, lines 1-6). The invention provides a nanocomposite comprising a layered silicate intercalated with an emulsion polymer (page 1 second paragraph from the bottom, page 2, lines 9-11). A process for making a nanocomposite comprises forming a dispersion of a layered mineral (montmorillonite) in water, including onium salt (reads on emulsifying agent of the instant claim 1) , adding a polymerizable monomer(s), such as olefin or diene with a polymerization initiator to a dispersion , and thereafter polymerizing the monomer(s) to form a latex comprising a water and a polymer nanocomposite (page 2, lines 15-22, claim 20). It is emphasized that swelling agents (page 3, lines 7-16), such as onium salts are sometimes serve as emulsifying agents, however, when the swelling agent is not an emulsifying agent, additional emulsifying agents are employed , and they are those typically used in emulsion polymerization process, wherein cationic and non-ionic emulsifying agents are preferred. Some cationic emulsifiers, such as octadecyl amine, are most preferred, since they also function as **montmorillonite surface modifiers (onium ions)**. This reads on the limitations of the instant claims 1 and 9 (page 3, lines 17-25). Among preferred monomers **styrene** and acrylonitrile, as well as **butadiene, isoprene** are named on page 2, lines 29-32.

Example 1 on page 5 utilizes montmorillonite, as a layered silicate and azobisisobutyronitrile (AIBN) as a free radical initiator.

Therefore, the limitations of the instant claims 1-5 and 9-11 are met by the disclosure of WO'910.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO'910 in view of Whitton et al (U.S.5,863,975).

WO'910 does not specifically disclose the emulsifiers, recited in claims 7 and 8, however, WO'910 clearly teaches the genus of onium salts that, cationic emulsifiers, such as octadecyl amine, since they also function as **montmorillonite surface modifiers**. **WO'910 provides a genus of onium salts of the general formula $AM^+R^1R^2R^3R^4$** permutations allowed by the virtue of substitute groups of the above formula allows for substitute trimethylammonium chlorides, as per instant claim 8, therefore, WO'911 clearly motivates a person skilled in the art utilize onium salts that are active towards **montmorillonite**, and in particular those incorporating trimethyl ammonium chloride.

Polymerizable emulsifiers are known in the art of emulsion polymerization. Whitton discloses emulsion and suspension polymerization process in the presence of hectorite (scheme in col. 12), wherein besides the acrylic monomers (monomers A on scheme in col. 11, 12), the emulsifying agent presents the polymerizable emulsifier, those presented as © in col. 6, lines 25-65. Therefore, a person skilled in the art would have found it obvious, motivated by a generic teaching of WO'911 to employ a polymerizable group, as one of the substitute R1, R2, R3 or R4 in WO'910, by acyloyl groups as taught by Whitton in order to increase the affinity and interaction of emulsifying agent with silicate layer, and thus to arrive at the instant claims.

Art Unit: 1713

10. Claims 7 and 8 are separately rejected under 35 U.S.C. 103(a) as being unpatentable over WO'910 in view of Ozawa et al (U.S. 5,369,166). As shown above the generic teaching of WO'910 provides suggestion and motivation to those skilled in the art to employ the onium salts that have most affinity to the silicate layers participating in polymerization.

Ozawa shows the suitability of polymerizable emulsifiers in the process of emulsion polymerization (col.5, lines 20-30), and more than that he shows the functional equivalency in usage of polymerizable emulsifiers along with those exemplified by WO'910. In the instant case substitution of equivalent compounds requires no express motivation, as long as the prior art recognizes equivalency, *In re Fount* 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *Graver Tank & Mfg. Co. Inc. V. Linde Air products Co.* 85 USPQ 328 (USSC 1950).

Therefore, the combination of references renders claims 7 and 8 prima facie obvious and properly rejected under 35 USC 103(a).

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Badesha et al (U.S. 5,840,796) discloses a method of making polymer nanocomposite including a **mica-type layered silicate** (MTS) and a fluoroelastomer, wherein the nanocomposite has a structure selected from the group consisting of an exfoliated structure and an **intercalated structure** (abstract, Fig.1). Materials falling within the general designation of MTS **include montmorillonite, bentonite, hectorite, vermiculite and saponite** (col.2, lines 43-460). Other prior art

Art Unit: 1713

cited in PTOL-892 shows the general state of the art in polymer/silicate nanocomposite materials.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tatyana Zalukaeva whose telephone number is (703) 308-8819. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (703) 308-2450. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

Tatyana Zalukaeva, Ph.D.
Primary Examiner
Art Unit 1713



October 23, 2003